TEEN EXPECTATIONS FOR SIGNIFICANT LIFE EVENTS

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Managing risks is an important part of growing up. Young people must decide whether to do things that they do not like (e.g., homework) in the hopes of getting things that they do (e.g., good jobs). They must also decide whether to avoid doing things that they do like (e.g., drinking heavily) in order to reduce the risk of outcomes that they do not (e.g., auto accidents). Making these decisions effectively requires accurate assessments of the probabilities of uncertain events occurring in their lives. As a result, risk perceptions play a central role in many psychological theories of adolescent development and health behavior (e.g., Beyth-Marom and Fischhoff 1997; Feldman and Elliott 1990; Fischhoff, Downs, and Bruine de Bruin 1998; Institute of Medicine 1999; Jacobs and Ganzel 1993) and in interventions designed to improve these perceptions (e.g., Baron and Brown 1991; Millstein, Petersen, and Nightingale 1993; Schulenberg, Maggs, and Hurnelmans 1997). Risk (and benefit) perceptions are also central to economic theories of human capital formation, which hold that teens' willingness to invest in themselves should reflect the

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expected return on that investment. Thus, education should be more valuable to teens who expect it to increase their chances of employment and who expect to live long enough to reap those rewards (Dominitz and Manski 1996).

The present study reports the expectations reported by teen respondents to the 1997 National Longitudinal Study of Youth (NLSY97; Bureau of Labor Statistics 1998; Center for Human Resource Research 1998), regarding 18 significant life events. The questions were formulated in order to allow comparison of answers with public health statistics. The set of questions was designed to evaluate teens' usage of the probability response mode as well (see also Budescu and Wallsten 1995; Dominitz and Manski 1997a, 1997b; Quadrel, Fischhoff, and Davis 1993; Yates 1990).

The overall NLSY97 question pool reflects the work of many investigators, specialists in the topics of NLSY97's many modules. These expectation questions were administered to 15- and 16-year-olds, using computers brought into respondents' homes. Its questions were refined through one-on-one focused interviews with a diverse group of Pittsburgh-area teens.

Method

SAMPLE

The NLSY97 is designed to be representative of the U.S. population, with black and Hispanic youth being oversampled. Eligible teens were identified in screening interviews that reached 93.8 percent of housing units selected in a stratified multistage area probability sample. Of those eligible, 91.7 percent were eventually interviewed (Bureau of Labor Statistics 1998).

A total of 3,544 adolescents, born in 1980 and 1981, received the expectation questions analyzed here. According to self-reports, 50.4 percent were male; mean age 15.8; 34.2 percent currently employed; 94.9 percent currently enrolled in school (mean grade 9.9; 90.2 percent in public school); 98.4 percent never married; 98.8 percent living with parent or guardian; 74.3 percent living in a house (13.5 percent in an apartment, 6.2 percent in a trailer, 5.1 percent in a townhouse or condo); 49.0 percent white, 26.7 percent black or African American, 20.8 percent Hispanic, and 3.5 percent other. All item response rates were above 97 percent.

RESPONSE MODE

The expectations module opens by explaining the probability response mode. Its wording was designed to encourage using all values on the 0%–100% response scale, including the extremes and nonround numbers. The questions used an open-ended response mode, requiring respondents to produce their own numbers. Doing so increases the chances of respondents sometimes using

"50" to express epistemic uncertainty (i.e., "fifty-fifty"), rather than a probability (Bruine de Bruin et al. 2000; Fischhoff and Bruine de Bruin 1999). Also, any reluctance to produce noninteger values (Poulton 1989) could affect the use of probabilities between 0%–1% and 99%–100%. The substantive conclusions are robust to the extreme measure of excluding all 50s, as though none reflected numerical probabilities.

Results

Table 1 presents questions and summary statistics.[1] For responses to each question, our data analysis considers (*a*) the picture of teens that they present, (*b*) their accuracy, and (*c*) their consistency with related questions on other modules. One strength of NLSY97 is having such questions, developed independently by domain specialists and placed elsewhere on the survey (reducing any pressure for consistency). We also consider correlations across judgments, looking for method variance. Future waves of NLSY97 will allow evaluating individual respondents' predictions. This initial cross-section allows only comparing overall predictions with statistics for similarly aged individuals (assuming that the present cohort will fare like its predecessors).

WARM-UP

The first two questions, on the prospects of eating pizza and contracting flu during the year ahead, were designed to ease respondents into the task and to see how they used the response mode on low-involvement topics. In both cases, they reported reasonable beliefs, including a willingness to use extreme response mode values.

SCHOOLING

Respondents overwhelmingly expected to be in school a year hence, with a mean probability of 92 percent and a median and mode of 100 percent. These are reasonable aggregate estimates, considering that 95 percent of the teens in this sample reported being currently in school. Teens not in school gave appreciably lower probabilities ($\bar{x}$: 45.7 percent vs. 94.5 percent), producing

1. These appear in appendix A. The order of the questions has been rearranged to facilitate the exposition. The actual order is indicated in table 1. These variations should not affect our interpretations. We have dropped one question from this analysis: "What is the probability that you will get seriously drunk in the next year?" Unfortunately, we do not know how teens defined "seriously drunk," making it hard to interpret their responses and compare them with public health statistics. The mean was 20 percent; the median and mode were 0 percent (the response used by 59 percent of the sample). The sources of the statistical estimates are provided in appendix B and in an appendix available from the authors and in the online edition of *Public Opinion Quarterly*. There is some imprecision in the statistical estimates and in their match to the survey questions. Our comparisons reflect this uncertainty.

Table 1. Responses to Questions in Expectation Module of NLSY97

Item (What do you think is the percent chance that you will . . .)	Number of Respondents	Mean (%)	Median (%)	Standard Deviation	Percentage of Responses 0%	50%	100%	Statistical Estimate[a]
1. Eat pizza sometime in the next year?	3,536	93.6	100	18.9	.6	3.1	81.5	N.A.
2. Get the flu sometime in the next year?	3,512	49.6	50	34.2	7.2	23.5	15.6	31
3. Be a student in a regular school one year from now?	3,538	92.1	100	22.9	3.2	3.6	82.2	93
4. Have received a high school diploma by the time you turn 20?	3,533	93.4	100	18.8	1.4	3.5	77.2	84
5. Have a 4-year college degree by the time you turn 30?	3,521	72.8	85	31.5	5.3	14.9	35.6	30
6. If you are in school a year from now, . . . also be working for pay more than 20 hours per week?	3,520	59.8	60	32.8	9.1	21.8	19.7	32
7. If you are not in school a year from now, . . . also be working for pay more than 20 hours per week?	3,494	79.9	100	29.5	4.6	10.6	51.1	60
8. Be working for pay more than 20 hours per week when you turn 30?	3,518	92.3	100	17.1	.5	4.6	67.0	91
9. [If female] Become pregnant within 1 year from now?	1,749	6.3	0	16.5	74.7	4.1	.8	<6
10. [If male] Get someone pregnant within the next year?	1,760	9.5	0	18.4	61.6	7.5	.7	<3
11. [If female] Become the mother of a baby sometime between now and when you turn 20?	1,739	16.3	0	26.3	50.5	9.0	3.3	<23
12. [If male] Become the father of a baby sometime between now and when you turn 20?	1,760	19.2	5	25.6	39.3	14.1	2.3	10

13. Be the victim of a violent crime at least once in the next year?	3,496	14.7	5	20.8	39.9	11.4	.7	10
14. Be arrested, whether rightly or wrongly, at least once in the next year?	3,518	10.2	0	18.2	51.3	7.4	.5	<10
15. Serve time in jail or prison between now and when you turn 20?	3,529	5.3	0	13.2	67.2	2.8	.3	.6
16. Die from any cause (crime, illness, accident, and so on) in the next year?	3,445	18.6	10	22.5	30.2	19.8	.9	.08
17. Die from any cause (crime, illness, accident, and so on) between now and when you turn 20?	3,440	20.3	10	22.5	26.1	21.0	.8	.4

NOTE.—Actual question order was 2, 1, 3, 6, 7, 9, 10, 13, 14, 16, 4, 15, 11 and 12, 17, 5, 8. The "seriously drunk" question (see n. 1 above) came after no. 10.

[a] The sources of these statistical estimates are described in appendix B and in an appendix available from the authors and in the online edition of *Public Opinion Quarterly*.

a rank order correlation (γ) of .87 between current school status and future school expectations.[2] These probabilities were correlated positively with self-reports of the "percent of peers who plan to go to college" ($\gamma = .29$) and negatively with the "percent of peers who have cut classes or school" ($\gamma = -.15$), further suggesting their reasonableness as expressions of respondents' beliefs.

Respondents had similarly high expectations of achieving a high school diploma by age 20 ($\bar{x} = 93$ percent). These were higher for students currently in school than for those who were not (95.1 percent vs. 60.9 percent; $\gamma = .76$); they were correlated with peers' college plans ($\gamma = .24$) but not with peers' tendency to cut classes ($\gamma = -.03$). These judgments represent modest optimism (compared to the 84 percent completion rate of current 20-year-olds), but much less optimism than that for predictions of earning a 4-year college degree by age 30 (where the mean judgment is over twice the current rate: 72.8 percent vs. 30 percent). The college-degree judgments were sensibly higher for teens now in school than those no longer in school ($\bar{x} = 74.7$ percent vs. 37.1 percent; $\gamma = .64$). They were also correlated with other plausible indicators: highest-level math class taken ($\gamma = .29$), number of math classes taken ($\gamma = .31$), and percent of peers seen as planning to go to college ($\gamma = .30$).

Respondents reported a mean probability of 59.8 percent for working 20 hours a week in a year's time if in school then, and 79.9 percent if not. Both means are higher than current youth employment rates. Each correlated sensibly with other responses: working for pay in the past week ($\gamma = .21$, .25, for teens currently in school and not, respectively), currently wanting a job ($\gamma = .33$, .05; n.s.), and having had paid employment since their fourteenth birthday ($\gamma = .20$,.29). The mean probability of working at age 30 was very close to current rates of labor force participation (92.3 percent vs. 91 percent). These predictions correlated well with educational expectations (γs: in school in a year, .40; diploma by 20, .54; college degree by 30, .33).

FERTILITY

Almost three-fourths of the (female) respondents assigned a 0 percent chance to getting pregnant in the next year. The mean probability of 6.3 percent is close to the estimated rate for women of this age. Respondents' higher mean probability of being mothers by age 20 was also close to the statistical estimate (26.3 percent vs. 23 percent). As seen in table 2, these judgments were con-

2. With such large samples, correlations as small as $r = .07$ are statistically significant at $\alpha = .001$. Unless otherwise noted, all reported statistics pass this level. Due to (often extreme) departures from normality, rank correlations were chosen to analyze the data. Goodman-Kruskal γ was selected over other rank correlations because of its superior properties for dealing with ties, common in these data.

Table 2. Correlations (γ) of Other NLSY97 Questions with Fertility Expectations

Other NLSY Question	Females: Get Pregnant in Next Year	Females: Mother by 20	Males: Get a Woman Pregnant in Next Year	Males: Father by 20
Ever had intercourse	.49***	.45***	.43***	.36***
Intercourse more than once[a]	.26**	.19*	.27***	.18**
Age at first intercourse[a]	−.13**	−.11**	−.05	−.12**
Number of partners ever[a]	.12*	.14***	.14***	.12**
Intercourse per year (number)[a]	.09	.06	.09*	.05
Ever been pregnant[a]	.10	.16*	…	…
% peers have sex	.24***	.23***	.25***	.23***
Expectation of pregnancy in next year	…	.62***	…	.60***

[a] These correlations include only the 38.1 percent of respondents who reported ever having “had sexual intercourse, that is made love, had sex or gone all the way with a person of the opposite sex.”
* $p < .05$.
** $p < .01$.
*** $p < .001$.

sistently and sensibly correlated with responses to other fertility-related questions.

Male respondents assigned higher probabilities to the fertility events than did the females. Although much higher than the statistical estimates, these judgments correlated sensibly with other NSLY97 items (table 2).

Blacks and Hispanics had higher expectations of pregnancy in the next year and of parenthood by age 20 (3–4 percent difference in means for females, 6–8 percent for males). The gender difference came predominantly from these groups.

CRIME

These teens saw, on average, a 15 percent chance of being victims of a violent crime in the next year, with about 40 percent seeing no chance at all. Although no NLSY97 question asked about prior victimization in these terms, 19.2 percent of respondents reported having been targets of repeated bullying before age 12, while 18.2 percent reported having been threatened at school at least once. One national survey (RAND 1998) estimates a 10 percent incidence, close to the teens' mean judgment.

On average, these teens estimated a 10 percent chance of being arrested (rightly or wrongly) in the next year (with half seeing some chance) and a 5 percent chance of serving time in jail or prison during the 4–5 years between the interview and age 20 (with a third seeing some chance). Both are overestimates, the latter by a large degree. These expectations had sensible correlations with other NLSY97 crime-related questions: γs in the .35–.46 range for self-reported past criminal behavior; in the .12–.23 range for estimates of peer gang membership and illegal behavior. There were strong correlations (r) between predictions of being arrested (.53) and serving time (.45). Expectations of being arrested and serving time were even more highly correlated (.67).

Victimization expectations were modestly lower for whites (2–3 percent difference in means) and for females (1–3 percent) in each race/ethnicity group. Black, white, and Hispanic females gave similar mean probabilities for arrest in the next year (6–7 percent) and jail by age 20 (3–4 percent). Mean probabilities of arrest were much higher for white and black males than for comparable females (by 11.2 percent, 17.6 percent, respectively), but not for Hispanic males (5.5 percent). Mean probability of jail by age 20 was higher for males in the white, black, and Hispanic groups (by 5.9 percent, 7.2 percent, and 10.2 percent, respectively).

MORTALITY

Figure 1 shows the probabilities given to "die from any cause—crime, illness, accident, and so on," either "in the next year" (1*a*) or "between now and when you turn 20" (1*b*). The means (18.6 percent, 20.3 percent, respectively) are much higher than the statistical estimates. The medians are about half as large (10 percent in each case), with much of the difference reflecting the relatively high rate of 50s. As noted, some "50" responses may express epistemic uncertainty rather than numerical probabilities (with teens not knowing what to say or not wanting to think about it). Nonetheless, such judgments are not 0 percent (a response used by 30.2 percent and 26.1 percent of teens). Eliminating all 50s reduces the means to 11.0 percent and 12.5 percent (and both medians to 5 percent). Across groups, 1-year means ranged from 15.4 percent for white males to 22.4 percent for black males and females.

Mortality judgments for the two time frames were highly correlated ($r =$ .79). The small difference (1.7 percent) between means for death in the next year and by age 20 suggests a feeling of vulnerability without a clear temporal context. In the 37.4 percent of cases where the two judgments differed, 66.2 percent were larger for the longer time period, indicating some ordinal consistency. These judgments were weakly correlated with plausibly associated questions. Correlations (γ) with self-reports of current health, smoking and

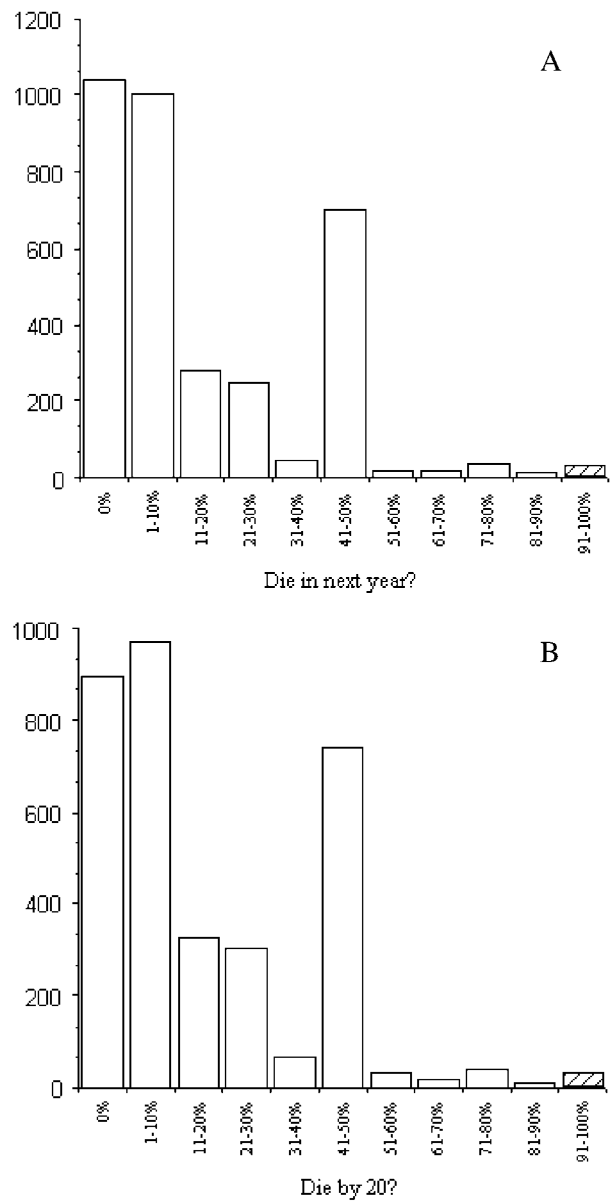

Figure 1. Response distributions. *A*, "What is the probability that you will die from any cause (crime, illness, accident and so on) in the next year?" *B*, "What is the probability that you will die from any cause (crime, illness and so on) between now and when you turn 20?" Almost all responses in the 41–50 percent range are 50 percent (96.7 percent for die in next year, 97.8 percent for die by age 20). Shaded regions represent responses of "100 percent."

drinking experience, attacking someone, seeing someone shot, and estimated percentage of friends belonging to a gang were all in the .07–.14 range.

FACTOR STRUCTURE

A principal components factor analysis yielded two significant factors. The larger accounted for 23 percent of the variance; it had large loadings for arrested next year (.66), jail by 20 (.65), die next year (.64), die by 20 (.64), baby by 20 (.62), pregnant next year (.61), and victim next year (.59). The second factor (15 percent of variance) had high loadings for diploma by 20 (.62), employed at 30 (.59), in school next year (.52), and college degree by 30 (.44). These factors might be called "physical risks" and "career risks," respectively.

There was no overall probability factor. Moreover, correlations with the flu question, which might capture a probability response bias, were all small ($r < .14$). The two questions about working next year were correlated with one another ($r = .29$), but little else.

PARENTS

For most teen respondents, one parent answered seven expectation questions regarding that teen. Parent and teen response distributions were quite similar, in terms of means, medians, standard deviations, and use of "50." Parents shared teens' generally high expectations for educational accomplishment, with no significant difference between mean judgments for being in school in a year and having a diploma by 20.[3] There were also strong correlations between the judgments of paired teens and parents, declining slightly as the time period increased (r = .71, .65, and .51, for being in school in one year, having a diploma by 20, and having a college degree by 30, respectively). Parents gave lower probabilities for their teens working in a year (46.2 percent vs. 59.8 percent), but similar ones for the teens working at age 30 (94.1 percent vs. 92.3 percent). Parents gave lower probabilities than teens for parenthood (15.2 percent vs. 17.8 percent) and incarceration (3.4 percent vs. 5.3 percent). Parent-teen correlations for these last four judgments ranged from .30 to .37. Thus, despite some modest differences, parents and teens generally showed similar beliefs and response-mode usage.[4]

3. Given the large sample size (approximately 3,000 parent-teen pairs for each question), means for all other questions were significantly different, even when the values were quite similar for any practical purpose.
4. The parents had larger 50 blips for the school and work questions, the teens for the fertility question—perhaps suggesting where each age group feels the largest epistemic uncertainty. Parents were not asked about their children's mortality risks, questions that seemed too disturbing.

Discussion

These teens show reasonable beliefs about most of these significant life events. They are moderately optimistic about some and moderately pessimistic about others, compared to statistical estimates. Their beliefs are, in general, sensibly related to other aspects of their life experiences. Nonetheless, the teens greatly overestimate their chances of death in the near future.

Before taking these probability judgments literally, it is appropriate to consider the evidence that these data provide regarding the validity of the response mode (supplementing previous evidence). The following results increase confidence in its ability to capture teens' beliefs.

a) The relative accuracy of most aggregate estimates (assuming that teens have relatively accurate beliefs, waiting to be captured by an appropriate response mode).

b) The lack of a general probability factor in the factor analysis (indicating no stable individual-difference tendency to give high or low probabilities).

c) The emergence of two interpretable factors, suggesting the clustering of beliefs regarding good (or bad) outcomes of career and physical events.

d) The sensible correlations between probability judgments and responses to related questions in other NLSY97 modules.

e) Respondents' use of the entire response range, providing consistently high responses to some questions and consistently low ones to others.

f) Gender and race/ethnic differences that seem to reflect social realities.

All these patterns support interpreting the response mode as capturing relatively well articulated ordinal beliefs. Items *a*, *b*, and *e* support its validity as an absolute scale.

Reasons for caution include:

1. The 50 blips, indicating an inability or unwillingness to give "proper" probabilities on some questions (beyond admitting the possibility of the event occurring).

2. The relative insensitivity of mortality judgments to time frame, with similar estimates for dying in one year and by age 20.

3. The evaluation of accuracy by comparing aggregate responses with statistical estimates, rather than by individuals' predictions with their own future progress (as will be possible when later waves of NLSY97 are complete).

4. The assumptions that these teens will have lives like their predecessors, when treating current statistical estimates as the evaluative standard. Perhaps these teens will achieve college degrees by age 30 at twice the rate of current 30-year-olds.[5]

5. An anonymous reviewer has suggested transforming the data so as to render the relationship between the mean probability judgments and statistical estimates linear. We are reluctant to do so for several reasons: (*a*) the number of data points is small, (*b*) the events were not selected with item-response curve analysis in mind, and (*c*) doing so would ignore what respondents had told us, regarding a response mode that we presented with an absolute definition (and which has

If we take these probability responses at face value, then the following picture emerges: generally speaking, these teens are optimistic about mastering career challenges. They expect to stay in school, secure degrees, get jobs, and delay pregnancy. For the short run, these expectations are relatively similar for both genders and for all three race/ethnic groups. As the time period lengthens, however, expectations diverge, with males, blacks, and Hispanics seeing less chance of success. Conceivably, the social realities of discrimination and limited opportunity carry greater weight for longer-term predictions, while personal hopes (or illusions of control) dominate the short term. These teens accurately estimate the risks of crime victimization, while overestimating the risks of incarceration; group differences are in the appropriate direction, although not necessarily of the appropriate magnitude.

Nonetheless, members of this representative sample of U.S. teens greatly overestimated their risk of dying in the near future. Moreover, these judgments were relatively insensitive to question wording (1 year vs. 4–5 years) and teens' personal circumstances, unlike the other probability judgments, which were sensibly related to questions in other NLSY97 modules. Using a similar methodology, Hurd and McGarry (1995) found adults to have relatively accurate mortality expectations, suggesting something special in how teens relate to these questions.

Speculatively, we offer the following account for these results: teens are doing what they can to manage their lives and see them as relatively under control. Yet, over all this hangs a feeling that their world is out of control, so much so that they could die in the near future. More than two-thirds of respondents assigned a nonzero probability to that possibility, with means of about 20 percent (and medians of 10 percent). The size of those means reflects many 50s, some of which may express epistemic uncertainty rather than numerical probabilities. However, even if they are not to be taken literally, these responses still suggest uneasiness about the future—as being too difficult or threatening to consider in detail.

If this account is accurate, then we might amend the common account of adolescent risk taking: teens may take risks, in part, because they underestimate the probability of things going wrong (as do adults). But they may also take risks, in part, because they underestimate what is at stake, as a result of overestimating the risk of dying. That is, they take risks not just because of an exaggerated feeling that they are not going to die, but also because of an exaggerated feeling that they are not going to live.

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been treated as such in many other studies). However, we present some suggestive results for those comfortable with such transformations. For the full set of 17 events, the R^2 between mean judged and statistical probabilities is .87 for the untransformed data and .93 for a cubic transformation, designed to fit the apparently S-shaped curve. Removing the two mortality questions, which seem anomalously inaccurate, has little effect on the fit of the equations.

Appendix A

Probability Question Instructions

Each of the next set of questions will ask you for your best guess at the chance that something will happen in the future. You can think of the PERCENT CHANCE that some event will occur as the number of CHANCES OUT OF 100 that the event will take place.

If you think that something is impossible, consider it as having a 0 percent chance. If you think the event is possible but unlikely, you might say there is a 3 percent chance or a 15 percent chance. If you think the chance is pretty even, you can say there is a 46 percent chance or perhaps a 52 percent chance. If you think the event is likely, but not certain, you might say there is a 78 percent chance or a 94 percent chance. If you think it is certain to happen, give it a 100 percent chance. Just to make sure that you are comfortable with the scale, I'd like you to do a few practice questions, and explain your answer to me.

What do you think is the percent chance that you will get the flu sometime in the next year?

What do you think is the percent chance that you will eat pizza sometime in the next year?

Think about yourself one year from now. The first questions concern what you expect to be doing then, in terms of school and work.

What is the percent chance that you will be a student in a regular school one year from now? [A definition is provided for respondents who ask what is meant by "regular school."]

Appendix B

Sources of Statistical Estimates in Table 1

Rounded values are used in table 1 because of imprecision in statistics and comparability with survey question.

1. *What is the probability that you will eat pizza some time in the next year?*

Probability: N.A. No available estimate.

2. *What is the probability that you will get the flu some time in the next year?*

Probability: 31.1 percent. Number of influenza cases per year (in 1994): 31.1 per 100 persons under 18 years of age (i.e., 31.1 percent).

SOURCE.—P. F. Adams and M. A. Marano. 1995. "Current Estimates from the National Health Interview Survey, 1994." Hyattsville, MD: National Center for Health Statistics, Vital and Health Statistics, vol. 10, no. 193. http://www.cdc.gov/data/10_193_1.pdf.

3. *What is the probability that you will be in a regular school one year from now?*

Probability: 93 percent. Estimate assumes school persistence rate for 15–16-year-olds (96.5 percent) for the 94.9 percent of NLSY97 sample currently in school and one-third return rate for those respondents who are not. The return rate is speculative; however, changes in it would make only small differences in overall rate, and not affect interpretation in text.

SOURCE.—U.S. Department of Commerce, Bureau of the Census. October 1996. Current Population Survey. Unpublished data. http://nces.ed.gov/pubs98/dropout/ch05t04a.html.

4. *What is the probability that you will have received a high school diploma by the time you turn 20?*

Probability: 84.0 percent. In March 1998, the percentage of 20-year-olds who have graduated high school.

SOURCE.—J. C. Day and A. E. Curry. 1998. "Educational Attainment in the United States, March 1998 (Update): Detailed Tables for Current Population Report, 1998." Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration. http://www.census.gov/population/www/socdemo/educ-attn.html.

5. *What is the probability that you will have a four-year college degree by the time you turn 30?*

Probability: 29.7 percent. The percentage of 30-year-olds with a bachelor's degree or higher.

SOURCE.—J. C. Day and A. E. Curry. 1998. "Educational Attainment in the United States, March 1998 (Update): Detailed tables for Current Population Report, 1998." Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration. http://www.census.gov/population/www/socdemo/educ-attn.html.

6. *If you are in school a year from now, what is the probability that you will also be working for pay more than 20 hours a week?*

Probability: 31.7 percent. The percentage of eleventh graders working 20 hours or more per week.

SOURCE.—"National Longitudinal Study of Adolescent Health." 1998. J. Udry, principal investigator. Cited in National Research Council. *Protecting Youth at Work*. Washington, DC: National Academy Press.

7. *If you are not in school a year from now, what is the probability that you will be working for pay more than 20 hours a week?*

Probability: 59.9 percent. In 1997, 59.9 percent of people aged 16 to 19 not enrolled in school were employed. This may overstate the rate for younger teens.

SOURCE.—Bureau of Labor Statistics. 1997. Labor Force Statistics from the Current Population Survey, Washington, DC. http://stats.bls.gov/news.release/hsgec.t02.html.

8. *What is the probability that you will be working for pay more than 20 hours per week when you turn 30?*

Probability: 90.6 percent. The projected participation rate for persons aged 25–34 in the year 2006 is 90.6 percent. The participation rate reflects the percentage of employed persons in the civilian noninstitutional population in that age range.

SOURCE.—U.S. Bureau of the Census. 1998. *Statistical Abstract of the United States*, 1998. 118th ed. Washington, DC: U.S. Bureau of the Census.

9. [If female] *What is the probability that you will become pregnant within one year from now?*

Probability: < 6 percent. The percentage of females between ages 15 and 19 who have had at least one pregnancy is 16 percent, with an average of 1.3 pregnancies.

Women in this group have had, an average, 2.5 years in which to have those pregnancies. Assuming one pregnancy per year and that these pregnancies are equally distributed for each age between 15 and 19, then the probability of a pregnancy per year is 4.2 percent. This should overstate the rate for NLSY97 teens who are at the lower end of this age range.

SOURCE.—J. Abma, A. Chandra, W. Mosher, L. Peterson, and L. Piccinino. 1997. "Fertility, Family Planning, and Women's Health: New Data from the 1995 Survey of Family Growth." Hyattsville, MD: National Center for Health Statistics, Vital and Health Statistics, 23 (19). http://www.cdc.gov/nchs/data/sr23_19.pdf.

10. [If male] *What is the probability that you will get someone pregnant in the next year?*

Probability: < 3 percent. In Minnesota, 52 percent of babies born to mothers under 18 have a father who is 0–2 years older than the mother. This rate is approximately the same for all ages under 18. Assuming that this rate is the same for getting someone pregnant, then the answer to this question results from multiplying 52 percent by the probability that a woman under 18 will get pregnant (see above). This estimate also assumes that each male gets just one young woman pregnant and that it is equally likely for a pregnancy to involve a father in this age group whether or not it goes to term.

SOURCE.—Minnesota Organization on Adolescent Pregnancy, Prevention and Parenting (MOAPPP), St. Paul, 1997. http://www.cyfc.umn.edu/moappp/agedifference.htm.

11. [If female] *What is the probability that you will become the mother of a baby sometime between now and when you turn 20?*

Probability: 22.7 percent. Birth rate in 1996: 54.4 per 1,000 women aged 15–19 (equal to 5.4 percent assuming one baby per teenage mother). Given a mean sample age of 15.8 years, there are 4.2 years until 20, making a total probability of 27.7 percent = 5.4 percent (4.2). This should be an overestimate, given that some women have more than one baby.

SOURCE.—S. J. Ventura, T. J. Mathews, and S. C. Curtin. 1998. "Teenage Births in the United States: State Trends, 1991-1996, An Update." Monthly Vital Statistics Report, vol. 46. no. 11, suppl. 2. Hyattsville, MD: National Center for Health Statistics. http://www.cdc.gov/nchswww/releases/98facts/98sheets/tnbrth96.htm#top.

12. [If male] *What is the probability that you will become the father of a baby between now and when you turn 20?*

Probability: 10.2 percent. In 1995, the birth rate is 24.3 per 1,000 fathers aged 15–19; the estimate sums over 4.2 years for the average respondent.

SOURCE.—S. J. Ventura, A. M. Joyce, S. C. Curtin, and T. J. Mathews. 1997. "Report of Final Natality Statistics, 1995." Monthly Vital Statistics Report, 45 (11), suppl. Hyattsville, MD: National Center for Health Statistics. http://www.cdc.gov/nchswww/releases/97facts/97sheets/95natrel.htm.

13. *What is the probability that you will be the victim of a violent crime at least once in the next year?*

Probability: 9.6 percent. Victims of violent crime (including homicide, rape, robbery, and both simple and aggravated assault) aged 16–19 (in 1997): 96.2 per 1,000 (i.e., 9.6 percent assuming one episode per teenager.)

SOURCE.—M. Rand. 1998. "A National Crime Victimization Survey Report: U.S. Criminal Victimization, 1997 Changes 1996–97 with Trends 1993–97." Washington, DC: Department of Justice, Office of Justice Programs and Bureau of Justice Statistics. http://www.ojp.usdoj.gov/bjs/pub/ascii/cv97.txt.

14. *What is the probability that you will be arrested* (*whether rightly or wrongly*) *at least once in the next year?*

Probability: < 10 percent. There were 2.8 million juvenile arrests in 1997; of these, 68 percent (or 1,904,000) were for teens 16–20. The total number of youths this age is approximately 19 million. Thus, the annual rate is 10 percent, assuming one arrest per teen. Multiple arrests lower the estimate for individual teens.

SOURCE.—*Crime in the United States, 1997.* 1998. Washington, DC: U.S. Government Printing Office. http://www.ncjrs.org/ojjdp/bulletins/9812_2/murder.html. U.S. Bureau of the Census, Population Division. 1998. "United States Population Estimates, by Age, Sex, Race, and Hispanic Origin, 1990 to 1997," release PPL-91. http://www.census.gov/population/estimates/nation/intfile2-1.txt.

15. *What is the probability that you will serve time in jail or prison between now and when you turn 20?*

Probability: .6 percent. If recent incarceration rates remain unchanged, an estimated 1 of every 20 persons (5.1 percent) will serve time in a prison during their lifetime. If people have not yet been incarcerated by age 20, the probability of going to jail in their lifetime is 4.5 percent. The probability of going to jail between birth and age 20 (i.e., .6 percent) should be this difference, divided by the probability of never going to jail, if not by 20.

SOURCE.—T. P. Bonczar and A. J. Beck. 1997. "Special Report: Lifetime Likelihood of Going to State or Federal Prison." Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. http://www.ojp.usdoj.gov/bjs/pub/ascii/llgsfp.txt.

16. *What is the probability that you will die from any cause—crime, illness, accident, and so on, in the next year?*

Probability: .08 percent. Death rate in 5-year age groups (in 1992): 84.3 per 100,000 people aged 15–19; the estimate assumes that this rate is the same in each age group.

SOURCE.—P. Gardner, H. M. Rosenberg, and R. W. Wilson. 1996. "Leading Causes of Death by Age, Sex, Race and Hispanic Origin: United States 1992." National Center for Health Statistics, Vital and Health Statistics, 20 (29). http://www.cdc.gov/nchs/data/sr_29.pdf.

17. *What is the probability that you will die from any cause—crime, illness, accident, and so on, between now and when you turn 20?*

Probability: .4 percent. Death rate in 5-year age groups (in 1992): 84.3 per 100,000 people aged 15–19, making the cumulative risk over 4.2 years $= 4.2 \times .0843$ percent.

SOURCE.—P. Gardner, H. M. Rosenberg, and R. W. Wilson. 1996. "Leading Causes of Death by Age, Sex, Race and Hispanic Origin: United States, 1992." National Center for Health Statistics. Vital and Health Statistics, 20 (29). http://www.cdc.gov/nchs/data/sr_29.pdf.

References

Baron, Jon, and R. Brown, eds. 1991. *Teaching Decision Making to Adolescents*. Hillsdale, NJ: Erlbaum.

Beyth-Marom, Ruth, and Baruch Fischhoff. 1997. "Adolescent Decisions about Risk: A Cognitive Perspective." In *Health Risks and Developmental Transaction during Adolescence*, ed. J.

Schulenberg, J. Maggs, and K. Hurnelmans, pp. 110–35. New York: Cambridge University Press.

Bruine de Bruin, Wändi, Baruch Fischhoff, Bonnie Halpern-Felsher, and Shana Millstein. 2000. "Expressing Epistemic Uncertainty: It's a Fifty-Fifty Chance." *Organizational Behavior and Human Decision Processes* 81:115–31.

Budescu, David F., and Thomas S. Wallsten. 1995. "Processing Linguistic Probabilities: General Principles and Empirical Evidence." In *Decision Making from a Cognitive Perspective*, ed. J. R. Busemeyer, R. Hastie, and D. L. Medin, pp. 275–318. New York: Academic Press.

Bureau of Labor Statistics. 1998. *NLS Handbook*. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics.

Center for Human Resource Research. 1998. *NLSY97 User's Guide*. Columbus: Ohio State University, Center for Human Resource Research.

Dominitz, Jeff, and Charles Manski. 1996. "Eliciting Student Expectations of the Returns to Schooling." *Journal of Human Resources* 31:1–26.

———. 1997a. "Perceptions of Economic Insecurity: Evidence from the Survey of Economic Expectations." *Public Opinion Quarterly* 61:261–87.

———. 1997b. "Using Expectations Data to Study Subjective Income Expectations." *Journal of the American Statistical Association* 92:855–67.

Feldman, Shirley S., and Glen R. Elliott. 1990. *At the Threshold: The Developing Adolescent*. Cambridge, MA: Harvard University Press.

Fischhoff, Baruch, and Wändi Bruine de Bruin. 1999. "Fifty/fifty = 50?" *Journal of Behavioral Decision Making* 12:149–63.

Fischhoff, Baruch, Julie Downs, and Wändi Bruine de Bruin. 1998. "Adolescent Vulnerability: A Framework for Behavioral Interventions." *Applied and Preventive Psychology* 7:77–94.

Hurd, Michael, and K. McGarry. 1995. "Evaluation of the Subjective Probabilities of Survival in the Health and Retirement Study." *Journal of Human Resources* 30:S268–S292.

Institute of Medicine. 1999. *Adolescent Decision Making*. Washington, DC: National Academy Press.

Jacobs, Jane, and A. K. Ganzel. 1993. "Decision Making in Adolescence: Are We Asking the Wrong Question?" *Advances in Motivation and Achievement* 8:1–31.

Millstein, Susan G., Ann C. Petersen, and Elena O. Nightingale, eds. 1993. *Promoting the Health of Adolescents*. New York: Oxford University Press.

Poulton, E. C. 1989. *Bias in Quantifying Judgment*. Hillsdale, NJ: Erlbaum.

Quadrel, Marilyn J., Baruch Fischhoff, and Wendy Davis. 1993. "Adolescent (In)vulnerability." *American Psychologist* 48:102–16.

RAND. 1998. *National Crime Victimization Study*. Santa Monica, CA: RAND.

Schulenberg, John, Jennifer Maggs, and Klaus Hurnelmans, eds. 1997. *Health Risks and Developmental Transactions during Adolescence*. New York: Cambridge University Press.

Yates, J. Frank. 1990. *Judgment and Decision Making*. Englewood Cliffs, NJ: Prentice-Hall.